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To examine the relationship between a teacher's critical thinking ability and his classroom verbal behavior and perception of teaching purposes, 39 teachers first completed the Watson-Glaser Critical Thinking Appraisal. The 10 highest and 10 lowest scorers were then observed and videotaped in their classrooms during three one-half hour periods, and their transcribed verbal behaviors were classified according to amount of student support and type of thought process (routine, cognitive memory, and convergent, evaluative, or divergent thinking). Finally, the 20 participants completed 10 questions about their teaching purposes and learning goals. Analysis of data revealed that teachers who had scored highly in critical thinking made a significantly greater number of comments in the categories of convergent, evaluative, and divergent thinking, and in support of students than did teachers with low critical ability; their stated purposes and goals were also more manifest in the classroom and were both academically oriented and student-centered. If training students in critical thinking is the central purpose of schools (and research indicates that critical thinking ability can be taught), then teachers need to be trained as models of such thinking during their own preservice or inservice education. The question remaining is who will teach the teachers' teachers? (LP)

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THE CRITICAL THINKING ABILITY OF TEACHERS AND ITS RELATIONSHIP TO THE TEACHERS' CLASSROOM VERBAL BEHAVIOR AND PERCEPTIONS OF TEACHING PURPOSES

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With all the talk and goings-on in education and in our society in general about the need to develop the thinking ability of children, and with the recent dictum from the NEA about the main purpose of education being teaching children how to think critically, we became curious about who the teachers are that can do this job - and how some of them go about motivating children to learn to think - since a teacher can't simply say to a child, "You'd better start to think and think critically, or else!" How does the child get the idea, as well as the experience of what thinking is and what thinking does, and get some "kicks" out of doing it to make it worth his while?

And so, with all of this in mind, we went about collecting empirical data using somewhat the naturalist approach - we went into the classroom and listened.

Purpose of the Study

Aspects of the very broad, complex, and significant problem of fostering in school good habits of thinking were the foci of this study. More specifically, we concerned ourselves with the type of thought processes used by classroom teachers as communicated through their classroom verbalizations in relation to the critical thinking ability of these teachers. Two auxilliary purposes of the study were: (1) to determine the quantity of supportive, non-supportive, and neutral comments made by these teachers in relation to their critical thinking ability, and (2) to examine the teachers' stated purposes in specified classroom lessons in relation to the teacher's critical thinking ability.

Now, if training in critical thinking is the central purpose of the schools, it follows that all teachers should be skilled in the techniques of critical thinking in order to serve as models in demonstrating and eliciting its use in the classroom. (The media for critical thinking should be the regular classroom curricula; critical thinking should neither be thought of or taught as a separate entity.)

We cannot presume to prescribe how teachers should teach unless we can

describe teaching as an observable and modifiable form of behavior, and there is no substitute for observation if you want to know the facts. If we want to know what teaching is going on, the place to begin is in the classroom. When we communicate our thoughts, we nearly always use words. We may reinforce these words by other means such as gestures, tones of voice, and facial expressions, but words generally carry the basic message. Words, then, are the indispensable tools of teaching thinking.

Since the ability of students to think critically appears to be the central purpose and a primary goal of education; since the teacher appears to be the vital determiner in the attempt to teach critical thinking in the schools; since words appear to be the indispensable tool of thinking; it therefore seems reasonable to examine the types of thought processes exemplified in teachers' classroom verbalizations in relation to the teachers' cricial thinking ability as the initial step in determining to what extent teaching for critical thinking is an actuality today.

Procedures of the Study

The specific concern of this study was to examine the critical thinking ability of teachers and its relationship to the teachers' classroom verbal behavior and perceptions of teaching purposes. Thirty-nine teachers from six schools (three elementary, two junior high, and one high school) volunteered to take the Watson-Glaser Critical Thinking Appraisal. The critical thinking scores of these teachers ranged from 59 to 92; the ten teachers with the highest scores and the ten teachers with the lowest scores in this critical thinking appraisal, were chosen as the sample group. There was a decided difference between the two groups. The critical thinking scores of the group chosen to represent individuals high in critical thinking ability fell in the upper quartile when compared to college senior women, while the individuals in the low-scoring group fell in the lower quartile. There was no appreciable difference in the two groups when age,

gender, grades taught, years of teaching experience, and years of college attendance were considered.

Each of these twenty teachers was observed for three one-half hour periods at different times during the teaching day in order to cover a variety of content material, and all observations were tape recorded. All of the teachers' recorded verbal comments were transcribed and then classified in two ways by four judges. First, all comments were classified according to the thought processes evidenced as routine, cognitive memory, convergent thinking, evaluative thinking, and divergent thinking by a classifying process developed by Aschner and Gallagher at the Institute for Research in Exceptional Children, University of Chicago. Second, all comments were classified as supportive, non-supportive, and neutral. After the third and last observation the teachers were asked individually a series of ten questions designed to elicit their perceptions of teaching purposes and learning goals.

The t test was the statistical procedure used to test the significance of the mean difference of the frequencies of the eight different verbal classifications; the level of significance chosen was .05.

Interpretation of Findings

The high-scoring group evidenced a mean frequency of classroom verbalizations that exceeded those of the low-scoring group by 74.9 verbal comments for the three observations. The mean frequency of comments elicited by the teacher from the students was 154.0 for the high-scoring group and 88.9 for the low-scoring group. The number of student comments elicited by the high-scoring group was almost twice that of the low-scoring group. There were greater frequencies of verbalizations from both the teachers and the students in the high-scoring group resulting from a greater number of classroom verbal interactions.

The teachers scoring high in critical thinking ability made a greater

number of verbal comments in the areas of convergent thinking, evaluative thinking, and divergent thinking than did the low-scoring group. The difference in the mean frequencies of the comments in these three areas was significant at both the .05 and .01 levels.

The high-scoring group showed larger mean frequencies of comments in the areas of routine and cognitive memory than did the teachers low in critical thinking ability. However, the low-scoring group showed a larger percentage of their comments to be in the areas of routine and cognitive memory even though the actual number was less. However, these mean differences between the two groups were not found to be significant.

Thus it appears that statements made in the routine and cognitive memory categories are not related to a high measured ability in critical thinking; however, statements evidencing the thought processes exemplified in convergent, evaluative, and divergent thinking do appear to be significantly related to a high measured ability in critical thinking.

The high-scoring group again made a significantly greater number of comments that evidenced support of children than did teachers scoring low in critical thinking ability. Though teachers in the high-scoring group made fewer non-supportive comments than did teachers in the low-scoring group, this difference was not found to be significant. The high-scoring group made a significantly greater number of neutral comments than did the low-scoring group; however, this seems to be related to the significantly greater number of total comments made by the high-scoring group.

After the third and last observation, the individual teachers were asked a series of questions concerning their perceptions of teacher purposes and learning goals for the students that related to this final observed lesson. Some of the differences in the answers given by the high-scoring group and the low-scoring group are as follows:

High-Scoring Group	Low-Scoring Group
1. Integrated subject matter to previous materials (80%)	1. Sequenced subject matter to previous materials (80%0
2. Material presented was important for reasons of integration (70%)	2. Material presented was important for reasons of sequencing (60%)
3. Considered making changes if presenting material again (70%)	3. Considered making changes if presenting material again (40%)
4. Stated goals of learning related to academic aims (80%)	4. Stated goals of learning related to academic aims (30%)
5. Learning goals observable in lessons taught (80%)	5. Learning goals observable in lessons taught (40%)
6. Stated purposes as teachers in terms of academic learning (90%)	6. Stated purposes as teachers in terms of academic learning (40%)
7. Stated purposes as teachers that were observable in the lessons taught (100%)	7. Stated purposes as teachers that were observable in the lessons taught (40%)
8. Took critical thinking appraisal because of curiosity (70%)	8. Took critical thinking appraisal because of curiosity (40%)
9. Stated needs of teacher education that emphasized child development and individual differences	9. Stated needs of teacher education in terms of earlier practical experience

Implications for Education

In considering the findings of this study there are several important implications for education. First, teachers scoring high in critical thinking ability made a significantly higher number of comments in the convergent, evaluative, and divergent thinking categories. The research showed that these types of comments involve the higher thought processes; therefore teachers who evidence high critical thinking ability themselves are giving students more frequent opportunities to use higher processes than are teachers low in critical thinking ability.

The second important implication for education is that the high-scoring group made a significantly greater number of comments evidencing support of students than did teachers scoring low in critical thinking ability. Here also research studies pointed out that verbal support or reinforcement of students by an adult increases both the quality of performance and the tenacity with which students stay with a task; this is especially true with students with below-average ability. In this respect teachers high in critical thinking ability would seem to be motivating the students' learning to a greater degree than teachers low in critical thinking ability.

Another implication for education found in this study was that teachers high in critical thinking ability stated teaching purposes and learning goals that were manifest and observable in their classroom teaching to a greater degree than did teachers low in critical thinking ability. This can indicate that these high-scoring teachers have given more consideration to their teaching purposes and have found ways to implement them in their teaching. Also, teachers in the high-scoring group stated purposes as teachers and goals of student learning that were academically oriented as well as student centered, as expressed by the value they place upon teacher education's need to emphasize

child growth and development, stressing the importance of individual differences based upon realistic principles of learning which include taking each student from where he is and moving forward from there.

Research studies strongly indicate that critical thinking ability can be taught, yet teachers low in critical thinking ability are not giving students opportunities or experiences in higher thought processes that would lead to the development of this important skill, and teachers high in critical thinking ability are, perhaps, not emphasizing these skills to the degree that they could. It is therefore vital that emphasis on critical thinking occur, and since the teacher is the one in the most strategic position to teach students this skill, teaching for critical thinking must have its beginning in teacher education courses and in-service teacher training. College and university professors and district leaders must become models of critical thinking to their students as well as provide these students with opportunities for and experiences in critical thinking. An isolated course in logic is not sufficient; critical thinking should become a major part and purpose of the curricula of teacher education.

A beginning must be made to enable all students in our schools to reach their highest po tentials in critical thinking ability at whatever grade level they may be. If the child can learn the skills of critical thinking only by being in an environment that is consistent, constant, and conducive to critical thinking, and where efforts toward thinking are encouraged, supported, and respected, can less than this be offered to students in teacher education? Here, then, is a wondrous cycle; can it be expected that students in teacher education programs will become skilled in critical thinking by taking a course, or even several courses, designed to advance critical thinking ability? Perhaps this is adequate for those who already possess a high level of critical

thinking ability and can therefore readily learn to adapt their teaching to the fullest encouragement of critical thinking skills in their students. However, for many classroom teachers and students in teacher education, constant and consistent opportunities for and experiences in thinking critically will need to be provided. They need to become models of critical thinking skills to their students and to be committed to the importance and value of teaching critical thinking as the primary purpose in their teaching. This can only occur if they themselves have college instructors who are skilled models of critical thinking committed to creating an environment conducive to the development of critical thinking skills. Perhaps now, one important question remaining is -- who will teach the teachers' teachers?

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